Committee on the Peaceful Uses of Outer Space

Script

Fifty-sixth session

660th Meeting
Wednesday, 19 June 2013, 3.00 p.m.
Vienna

Chairman: Mr. Yasushi Horikawa (Japan)

The meeting was called to order at 3.04 p.m.

The Chairman Good afternoon distinguished delegates, I now declare open the 671st meeting of the Committee on the Peaceful Uses of Outer Space.

Distinguished delegates,

I would first like to inform you of our programme of work for this afternoon. We will re-open agenda item 6, the Scientific and Technical Subcommittee, the Report of the Scientific and Technical Subcommittee. Yes? Oh... there was no translation. Is it working now? What? Oh. We have a conference on hold, it said.

Ok, now it's working. Thank you for your patience. I will start again from the beginning. I now declare open the 671st meeting of the Committee on the Peaceful Uses of Outer Space.

I would first like to inform you of our programme of work for this afternoon. We will re-open agenda item 6, Report of the Scientific and Technical Subcommittee on its fiftieth session and 10, Space and Water, to hear a statement by delegation, as requested. We will continue and hopefully conclude our consideration of agenda items 11, Space and Climate Change and 12, Use of space technology in the United Nations system. We will begin our consideration of agenda item 13, Future Role of the Committee.

There will be two technical presentations: by the representative of India entitled "Space observation for governance and empowering citizens in India", and by a representative of the Russian Federation entitled "Deflecting hazardous asteroids from collision with the Earth by using small asteroids".

Expert Group B is meeting from 2.00 to 5.00 p.m. in room C4. Expert Group A is meeting from 2.00 to 6.00 p.m. in room C6, and Expert Group C is meeting from 2.00 to 4.00 p.m. in room C0739.

Distinguished delegations are kindly reminded to provide to the Secretariat corrections or additions to the provisional list of participants (CRP.2) by close of business today, so that the Secretariat can finalize the list.

I would also like to remind delegates that this evening all are cordially invited to the traditional Austrian Heurigen evening, starting at 7.00 p.m.

Are there any questions on the proposed schedule?

I see none.

Distinguished delegates, I would now like to re-open agenda item 6, the Report of the Scientific and Technical Subcommittee on its fiftieth session.

Yes? I recognize the distinguished representative of Venezuela. You have the floor.

Mr. R. Becerra (Venezuela) Thank you, Sir. Thank you for calling on me. My delegation apologizes. I will take just a few seconds of this meeting's time to make a few procedural recommendations.

At the outset of this session and during other sessions, my delegation has regularly observed that some unfortunate proceedings are taking root. We find that very important documents are available only in English, and therefore respect for the official use of official languages needs to be mentioned. We do understand the efforts and all the work that the Secretariat has put into this and we know that there are working meetings at this point in time. And if there are some documents that are CRPs, well, this has become recurrent practice. So it would appear that the official language of the meeting, then, is only English.

We would like to call on member States and the Secretariat to do their utmost so that important documents as, for example, the topic of long-term sustainability of space activities are available in all U.N. languages. We cannot fail to mention this, and I must say that I am going to repeat this ad nauseum.

Second item: the technical presentations. At no point in time do we wish to take away significance from the importance of information that delegates are bringing to these sessions, but we have to look at the relevance because perhaps very important subjects get less time in order to make space or time available for technical presentations. This afternoon, 1 p.m., the

Director of the Office gave us very important information on UN-SPIDER. Such information should be given in plenary with simultaneous interpretation available and attendance of all delegations — in plenary. This is a U.N. initiative. It is our initiative and we would like to be informed. There were six technical presentations today and yet we didn't have a small slot available for the Director to come to plenary and give us all this information so I would ask you to please put to the construation of the room that for the remainder of the meeting, time should be set aside for the Director to give us important information here in plenary, so important as was the case then.

That's all I have to say. I apologize for taking some time of the meeting, but it is important and it shouldn't happen again. It's important. Thank you, Sir.

The Chairman I thank the distinguished representative of Venezuela for your intervention or remarks about the procedure of this Committee.

Now I would like to proceed with the agenda item 6. The first speaker on my list is the distinguished representative of South Africa. You have the floor.

Ms. Melefane (South Africa) Thank you, Mr. Chairman. Distinguished delegates, the delegations of South Africa supports the adoption of the report of the Scientific and Technical Subcommittee of COPUOS and would like to commend Mr. Felix Menicocci of Argentina for his excellent leadership of the Subcommittee.

South Africa welcomes the progress that has been made on the Long-Term Sustainability of Outer Space Activities. The establishment of the four expert groups under the Working Group on the Long-Term Sustainability of Outer Space Activities has proven to be an effective means of considering the wide range of topics in related thematic clusters. We thank all delegations that have expressed their confidence in the leadership of this Working Group chaired by Dr. Peter Martinez, a member of our delegation, and we congratulate the eight co-chairs of the four expert groups for their excellent leadership of the work in their respective expert groups. South Africa also appreciates the active participation of many national experts in these expert groups.

Mr Chairman, the long-term sustainability of outer space activities is a matter of concern not only for current and aspiring space actors but for the international community as a whole, as the space environment is being used by an increasing number of States, non-governmental organizations and private sector entities. The proliferation of space debris and the possibilities of collisions and interference pose serious threats to the long-term sustainability of space activities, particularly in the low-Earth orbit and geostationary orbit environments. The Committee on the Peaceful Uses of Outer Space has a fundamental role in addressing these challenges.

Mr Chairman, the Scientific and Technical Subcommittee at its 50th Session, agreed to begin consideration of a new agenda item, "Space technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda", which is aligned to the terms of reference of the Working Group mandate to examine the long-term sustainability of outer space activities in the wider context of sustainable development on Earth, including the contribution to the achievement of the Millennium Development Goals, taking into account the concerns and interests of all countries, in particular those of developing countries, and consistent with the peaceful uses of outer space.

Mr Chairman, though the guidelines to be proposed by the Working Group on the Long-Term Sustainability of Outer Space Activities are voluntary and non-binding, they will set in place particular norms of behaviour in outer space, that will apply just as much to the established space actors as to emerging and aspiring space actors. It is our wish that the guidelines to be adopted should not have the unintended consequence of raising the technical, scientific and financial barriers of entry into space for aspiring space nations. For this reason we encourage the Working Group to take into account the needs and interests of developing countries in the process of discussing and negotiating the guidelines.

Mr Chairman, given the concerns raised by some delegations with respect to the framework potentially limiting activities of emerging space nations, South Africa wishes to emphasize the need for the Working Group to test the framework being developed for Long Term Sustainability against the principle of common but differentiated responsibilities and respective capabilities. This principle includes two fundamental elements. The first addresses the common responsibility of States for the protection of the space environment, or parts of it, at the national, regional and global levels. The second concerns the need to take into account the different circumstances, particularly each State's contribution to the evolution of a particular problem and its ability to prevent, reduce and control the extent of that problem.

I thank you, Mr. Chairman.

The Chairman I thank the distinguished representative of South Africa for her statement.

Are there any other delegations to speak at this, on this agenda item at this time? If none, I will conclude the agenda item 6, the report of the Scientific and Technical Subcommittee, at this time.

I would now, distinguished delegates, I would now like to re-open agenda item 10, Space and Water, to hear a statement by a delegation.

I give the floor to the distinguished representative of Brazil. You have the floor.

Mr. Pitaluga (Brazil) Thank you, Mr. Chairman.

Mr Chairman, distinguished delegates, it is widely known that while water covers 71 per cent of the Earth's surface, 96.5 per cent of each is found in oceans, 1.7 per cent in ground water, 1.7 per cent in glaciers and the ice caps and only a very small fraction in other large water bodies. Only 2.5 per cent of the Earth's water is fresh water and 98.8 per cent of that water is in ice and ground water. So, Mr. Chairman, we are left with less than 0.3 per cent of all fresh water in rivers, lakes and the atmosphere.

In paragraph 119 of the final document of the Rio+20 conference "The future we want", water is placed at the core of sustainable development. The importance of integrating water and sanitation within the economic, social and environmental aspects of sustainable development cannot be overplayed. As States and international organizations strive to provide access to safe drinking water and basic sanitation in line with the commitments made in the Johannesburg Plan of Implementation and the Millennium Declaration, fresh water sources are placed under greater stress.

Moreover, Mr. Chairman, in paragraph 122 of the same document, the same document points out the key role that ecosystems play in maintaining water quantity and quality, and draws attention for the importance of actions within respective national boundaries to protect and sustainably manage these ecosystems.

A recent report entitled "Charting our water future" published by the Water Resource Group estimates that by 2030, in some regions of the world, water demand will exceed supply by over 50 per cent. Developing countries many of which are already plagued by a shortage of water are those that may be hit the hardest by this scenario.

All this underscores the critical importance of space science in the management of water resources. In this regard, space science and its implications have an important role to play in addressing this scenario be its through monetary, capacity-building, technology transfer and data transfer. Space-derived data is an important tool to support policymakers in making informed decisions on water resource management.

Mr. Chairman, I am pleased to recall that this Committee acknowledges the growing awareness of and concern regarding water-related issues by referring in its 2012 report to U.N. General Assembly resolution 58/217, which proclaimed the period 2005-2015 the International Decade for Action: Water for Life. The above-mentioned resolution emphasized that water is critical for sustainable development, including environmental integrity and their eradication of poverty and hunger, and it is indispensable for human health and well-being. In order to advance the goals of the decade, the resolution calls for the furtherance of cooperation at all levels and the coordination of the relevant U.N. bodies, specialized agencies, regional commissions and other organizations of the United Nations system to deliver a coordinated response utilizing existing resources and voluntary funds to make Water for Life a decade for action. And space science and its applications and COPUOS have an important role to play in realizing the aims of Water for Life.

Mr. Chairman, most estimates place Brazil as one of the countries with the largest availability of annual renewable water resources, which 8,233 billion cubic metres per year. With an extensive coast line of around 7,500 kilometres, the most extensive river system of the globe and which hydraulic energy as the primary of electricity generation in the country, the steady water resource can only be of utmost importance for Brazil. Adding the crucial role of water through its interactions with the hemisphere to climate forecast and to the comprehension of climate change, the state of inland waters as well as oceanic waters have received great attention in Brazil. In this regard, I am very much sure that the SABIA-MAR satellite currently being developed by Brazil and Argentina will be extremely useful.

The management of water resources is a key policy of the Brazilian Government. The creation of a national water resource management system was a clear response of the federal government to the concerns related to the management of this very important and precious natural resource. The Brazilian Water Act of 1997 created the national water resource policy and the national water resource management system, which led to the set-up of the Brazilian Water Agency in 2000. The whole system is designed to protect water resources and project the long-term needs that must be addressed to guarantee the availability and sustainability. Space-derived data is used and made available at no cost to assist decision- and policymakers in their task of addressing water-related

issues such as drought, pollution and water quality, waterborne disease, equitable access to water and sanitation. The importance of acquiring processing, interpreting and, most important of all, making space-derived data available to users has been confirmed by my delegation on several occasions at this Committee. Brazil is a keen advocate of data democracy policies and of the need to support developing countries in their effort to collect and use environmental and weather data.

Mr. Chairman, amongst relevant activities of Brazil in terms of water management is the participation in the ANTARES network. ANTARES is a regional network created in 2003 to study the long-term change in coastal ecosystems inside and around Latin America. Distinguish those due to natural variability from those due to external perturbations. To achieve this goal, in situ data from coastal stations and satellite data from the region are shared among members and with the public.

Another relevant activity is the participation in the "Pilot Research Moored Array in the Tropical Atlantic" Programme called PIRATA. This programme has been developed as a multinational observation network by Brazil, France and the United States to improve knowledge and understanding of ocean atmosphere variability in the tropical Atlantic ocean. The variability of the ocean atmosphere system in the tropical Atlantic is strongly influences regional variations and rainfall and consequently the economies of the adjacent continental regions.

Today, each is a very successful programme, which became international reference in the monitoring of moored array in the tropical Atlantic. The PIRATA project relies on the Brazilian SCD satellite and on Argos Systems for data collection. It aims at studying ocean atmosphere interactions in the tropical Atlantic that affect regional climate variabilities on seasonal into annual and longer time scales. The programme has undergone specials and enhancements along the years to improve its utility for describing, understanding and predicting relevant climate fluctuations.

Mr. Chairman, in 2012, as I have already mentioned with my opening statement, Brazil organized in connection with the ninth plenary session of the Group on Earth Observations (GEO), the blue planet symposium. It was held in Ilhabela from 19 to 20 November, hosted by the Brazilian National Institute for Space Research (INPE) and sponsored by the Canadian Space Agency, by GEO and the Partnership for the Observation of the Global Oceans. During this symposium, a new GEO task was created: "Oceans and Society: the Blue Planet", which brings together several societal benefit areas. Brazil is fully committed to this task, to which it is already making contributions in different manners. In terms of climate, for instance, Brazil organizations in collaboration with international institutions have been developing efforts in data collection, assimilation and modelling, which are of fundamental importance for operational monitoring and forecast, also including future scenarios.

In concluding, Mr. Chairman, I just would like to mention that the Brazilian National Institute for Space Research (INPE) is one of the several Brazilian institutions interested in the observational data collection models, data analysis and remote sensing over the Antarctic, the Southern Ocean and the South Atlantic Ocean. With a dedicated programme for research in the Antarctic region, INPE's data collection has been able to provide useful information with regard to the influence of sea water temperature in the southwest Atlantic on the weather and climate of Brazil's southern region.

Thank you all for your kind attention. Thank you, Mr. Chairman.

The Chairman I thank the distinguished representative of Brazil for his statement. We have concluded our consideration of agenda item 10, Space and Water.

Distinguished delegates, I would now like to continue and hopefully conclude our consideration of agenda item 11, Space and Climate Change. The first speaker on my list is the distinguished representative of Chile on behalf of GRULAC. This statement will be made on item 10 and 11.

Ms. T. Alvarez (Chile) Thank you so much, Sir. This statement is indeed under 10 and 11 of the agenda. GRULAC is of course aware of the world scope and negative impact of climate change and we're no strangers to that. These weather-related hazards such as flooding and drought has affected our region and of course understanding and mitigating the impact is vital for our countries. We're aware that application of space technology and satellite observation of the Earth gives us the tools to better manage these phenomena.

Furthermore, GRULAC is aware of the valuable contribution of COPUOS through the UN-SPIDER platform for natural disaster management, and those activities, particularly training for natural disasters, are activities we would like to congratulate the U.N. for. We thank OOSA very much indeed for these particular activities and also the sponsoring countries of course. GRULAC would like to reiterate for OOSA that it's important to step up coordination and international assistance for training programmes under this

particular topic, particularly for the benefit of developing countries.

Now, on activities in the context of the UN-SPIDER programme, GRULAC welcomes the fact that in this year we have a remote sensing course in the region. It also addresses digital processing of images in Santo Domingo, Dominican Republic, starting on the 13 of May this year and organized by SPIDER with the assistance of the emergency response agency of that country and there were actors from all areas and other countries of the region in attendance as well. GRULAC is pleased to note that this training course is a joint effort bringing together the Dominican Republic and concerned international bodies, the purpose of which is to continue to strengthen the prevention system and also response and mitigation systems in the event of possible disasters. GRULAC would like to underline the fact that there's a practical U.N. course on meteorological or space weather-related issues in October 2012 in Quito, Ecuador. This high-level course organized by OOSA, NASA and the USA supported this in cooperation with Ecuador, represented for the Quito observatory as well as scientific innovations services, the purpose of which is to bring information to participants of new scientific developments and space-based technology in order to understand the impact of space weather on the planet and the near environment.

Thank you, Sir.

The Chairman I thank the distinguished representative of Chile for her statement.

The next speaker is the distinguished representative of the United States of America. You have the floor.

Mr. J. Higgins (United States of America) Mr. Chairman, we all recognize that climate change is truly a global issue. UNCOPUOS is one of the many organizations that rightly consider climate variability and climate change a priority. Earth-observing satellites provide a unique perspective on the global, integrated Earth system. Satellite observations are an indispensable tool in the creation of fundamental knowledge about our environment and for understanding the implications of global climate change for society.

The United States shares in the common global goal of understanding the Earth's physical and living systems, including its changing climate, the impacts of climate change, and how human activities affect the environment. Since 1960, the United States has conducted space-based observation missions to better understand the Earth's environment. These missions have provided observations that document the status of and changes in the Earth's environment, such as global land use and land cover changes since 1972; the Antarctic ozone hole since 1978; summertime depletion of Arctic sea ice since 1978; total solar irradiance at the top of the atmosphere since 1978; global sea level rise since 1992; global ocean phytoplankton abundances since 1997; and Greenland and Antarctic ice sheet volumes since 2002.

Using satellite observations, together with surface-based observations, scientists around the world have demonstrated that climate change is, without doubt, occurring. Global deforestation is proceeding rapidly, reducing the ability of our terrestrial biosphere to absorb carbon dioxide from the atmosphere. Because of climate change, the ozone layer is changing in ways that were not anticipated when the Montreal Protocol was developed. The summertime sea ice coverage in the Arctic is being dramatically reduced by warming ocean waters and by increased air temperatures. These warming events have happened much faster than expected, causing increased heating of the atmosphere. The Greenland ice sheet is losing more mass each year than three times the total amount of ice in the Alps.

Global marine life is being diminished by increased heating of the ocean from the atmosphere and by increased absorption of carbon dioxide from the atmosphere. Greenland's melting ice, the loss of mountain glaciers, and the thermal expansion of the oceans due to heating are major contributors to global sea level rise.

Satellite observations are a primary source of scientific understanding of the Earth's changing environment and, thereby, form a critical component to the scientific foundation for subsequent actions by society. Satellite data are crucial to the development of international assessments, such as the climate assessment of the Intergovernmental Panel on Climate Change, and the ozone assessment of the World Meteorological Organization.

NASA presently contributes to the operation and data analysis of seventeen major satellite missions that provide high spatial resolution, high-accuracy, well calibrated, sustained observation of the land surface, oceans, atmosphere, ice sheets and biosphere. Many of these satellites involve international partnerships, illustrating the value of cooperation in the peaceful use of space. Additionally, NASA is now developing 11 Earth-observing research missions for launch between 2014 and 2020, and several of these involve international partnerships as well. The next launch will be the Global Precipitation Mission (GPM) in February of 2014, which is a major partnership between NASA and the Japanese Aerospace Exploration Agency (JAXA) and represents both continuity with the

long-running TRMM mission launched in 1997 and a major expansion in capability through incorporation of new technology including dual frequency radar, with coverage at higher latitudes due to a use of a higher inclination orbit, and incorporation of other nations' satellites in a constellation of passive microwave sensors to provide better diurnal sampling of precipitation. NASA's Earth-observing satellites also serve society directly. For example, many of the existing missions provide data for management, forecasts, and response to floods and drought, air quality, infectious diseases, and weather and extreme events.

Mr. Chairman, NOAA currently has four geostationary satellites and six polar-orbiting environmental satellites. Three geostationary satellites are operational and one is on-orbit storage. In polar orbit, NOAA operates one primary, three secondary and one backup satellite. NOAA also recently took over operation of the next-generation polar-orbiting operational satellite Suomi-NPP, created through a partnership between NOAA, NASA and the US Department of Defense.

NOAA's partnership with the European Organization for the Exploitation of Meteorological Satellites, or EUMETSAT, provides essential global coverage as well. Additionally, NOAA operates the JASON-2 ocean surface topography spacecraft, developed by NASA and the French space agency CNES and in collaboration with EUMETSAT.

In 2012, NOAA delivered five new Climate Data Records that provide societal benefits such as improved precipitation estimates for agriculture, improved human health forecasts for pollutants, better estimates of surface temperature trends, and improvements in fisheries impacts analyses, all essential in an era of increased climate uncertainty.

Through a partnership between NASA and USGS, the United States operates the Landsat satellites for monitoring land surfaces at a scale where natural and human-induced changes can be detected, characterized and monitored over time. Since 1972, Landsat satellites have consistently captured moderate resolution data of the Earth. This archive of data has become vital for agriculture and water management, disaster response, forest carbon monitoring, and monitoring incremental effects of climate change. A free and open data policy, combined with consolidation of the Landsat Global Archive, provides current, repeatable and historical access to over 40 years of terrestrial land cover change. With the successful launch of the Landsat Data Continuity Mission, which was renamed Landsat 8 when it became operational at the end of May this year, scientists throughout the world can now make direct comparisons to the past while taking advantage of significant advancements incorporated in the mission. These advancements include additional bands to improve atmospheric corrections to the data and higher quantization of the entire data stream to enable detection of more subtle changes.

Working in partnership with other nations is a central precept of the U.S. satellite observation strategy for the Earth's atmosphere, land surfaces and oceans. U.S. satellite observing activities contribute significantly to several international observing systems principally sponsored by elements of the United Nations, such as the World Meteorological Organization, the Intergovernmental Oceanographic Commission and the Food and Agriculture Organization.

The United States continues to work with the Global Climate Observing System, or GCOS, whose goal is to provide a comprehensive view of the total climate system. GCOS partners include NOAA and NASA as well as three international groups which the United States strongly supports and in which we maintain a leadership role: these are the Group on Earth Observations (GEO), the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS). GCOS constitutes the climate observing component of GEO's Global Earth Observation System of Systems.

Mr. Chairman, the United States continues to demonstrate the immense value of satellites to observe the changing global climate and for developing new fundamental knowledge on the global integrated Earth system. Satellite observations and the increased scientific understanding they enable can improve international security, enhance economic prosperity, mitigate impacts of short-term and climate-related hazards and strengthen global stewardship of the environment.

We would also like to emphasize the importance of collaboration in providing ground-based and in situ observations to complement, validate and enhance satellite data. This is an area that needs improvement and is an excellent area for potential cooperation among nations of varying capacity.

We will continue to work with the international community to enable comprehensive, coordinated and sustained Earth observation systems for the benefit of humankind today and into the future. To achieve this vision, United States policy is to maximize timely, full and open access to data from its civil satellites and to disseminate tools and knowledge to use this information. So that we all may observe and

understand the global climate changes occurring yesterday, today and tomorrow, the United States urges all countries to implement similar policies for open and transparent data sharing.

Today there is a growing understanding of the interactions among our planet's atmosphere, oceans, land and ecosystems, and the impact that humans can have on the Earth system. Through Earth observations, we will be able to work together, across all nations, to understand, protect and enhance quality of life on our home planet.

Mr. Chairman, thank you for the opportunity to share these views.

The Chairman I thank the distinguished representative of United States of America for his statement. The next speaker is the distinguished representative of Italy.

Ms. Di Ciaccio (Italy) Thank you, Mr. Chairman. Mr. Chairman, distinguished delegates, during the Kiruna Ministerial Meeting of the Arctic Council held last 15 May in Sweden, Arctic ministers signed a declaration titled "The vision for the Arctic". In this document the eight ministers recognize the uniqueness and fragility of the arctic environment and the critical importance of healthy ecosystems to sustainable communities.

The effects of climate change are increasingly affecting the Arctic region. As we know, large-scale melting of the Arctic snow, ice and permafrost entails negative consequences both for the local and the global environment.

The struggle against climate change in the polar regions is particularly challenging. The new opportunities deriving from the access to natural resources have made even more urgent to ensure the protection of such a fragile environment.

At the Kiruna Meeting, Italy, together with China, India, Japan, Republic of Korea and Singapore, has acquired the role of Observer State in the Arctic Council.

Ministers recognized that the fight to the global warming for the sake of the Arctic environment can take advantage from the active involvement of non-Arctic States, given their specific expertise, knowledge and political support.

In particular, the Arctic Council recognized the importance of the contribution of studies carried out by Italian research organizations and institutions in order to monitor and protect the Arctic region.

This contribution has been involving all the major Italian bodies engaged in space activities, such as the National Centre of Research, INAF, INFN, many universities and the Italian Space Agency.

Mr. Chairman, today I would like to focus on the contribution of the Italian Cosmo—SkyMed system. The COSMO-SkyMed SAR Constellation carries out continuous and accurate Earth observation, relying upon its unique characteristics that ensure all weather and illumination (day and night) capability, very high spatial resolution, reliability, stability and continuity.

The COSMO-SkyMed constellation can provide a revisit which cannot be matched by any other system, providing up to 16 acquisitions per day over a specific target at 70°N latitude.

Satellite imagery with X-band SAR allows better detection, measuring and tracking of ice floes on a daily basis. In addition, it gives better information on the size and movement of potential ice features, as well as increasing the ability to forecast their movements.

A recent important agreement involving COSMO-SkyMed and Finland will provide Finland with COSMO-SkyMed direct reception capabilities over the Baltic and a large part of the Arctic areas to monitor ice formation and movements and Arctic changes.

Thanks to this new partnership, a joint research project over the North Pole is forthcoming. As we know, given the ongoing global changes, part of the North Pole is expected to melt down during the Summer. At this stage, COSMO-SkyMed is the only satellite constellation endowed with capabilities to monitor the North Pole in all weather and illumination conditions. In this regard, a routine monitoring activity has already put in planning to track these changes.

Mr. Chairman, with growing interests of the oil and gas sector in the Arctic, it is clear that we are on the verge of a vast high-business development in the entire Arctic region. However, business development will determine new environmental challenges as a consequence of increased human traffic and activities. COSMO-SkyMed will give its contribution in terms of accurate information of such phenomena.

In conclusion, let me just underline that COSMO-Skymed positively collaborated in the "International Polar Year" efforts, providing its value-added images and building up, in this way, an extraordinary database of images of this region that can be used for studying the seasonal evolution of the Arctic ice.

Mr. Chairman, distinguished delegates, thank you for your attention.

The Chairman I thank the distinguished representative of Italy for her statement.

The next speaker on my list is the distinguished representative of the Republic of Korea. You have the floor.

Ms. Kim (Republic of Korea) Thank you Mr. Chairman.

For a several decades, significant changes have taken place in climate, primarily because of human activities such as fossil energy consumption, deforestation, non-optimal land use, etc.

Many countries use satellites in order to analyse this phenomenon and try hard to solve this global problem.

The Republic of Korea launched a geostationary satellite called COMS (Communication, Ocean, Meteorology Satellite) in 2010. The payloads of COMS play an important role for various scientific applications including climate change monitoring. The meteorological payload (MI) provides critical information to monitor severe weather events by observing the weather and climate phenomena at near real-time. The oceanic instrument GOCI helps the monitoring of ocean biophysical phenomena and maritime disasters (e.g. harmful algae blooms, oil spills, coastal water quality) over the Korean peninsula eight times per day.

Mr. Chairman, the deliberations under this agenda item would certainly pave the way for a better understanding of the climate system and attract international cooperation to deal with this common issue.

The Republic of Korea is looking forward to joining hands with member countries to evolve a unified approach to address the global common problem of climate change that is bound to affect all humankind.

Thank you Mr. Chairman.

The Chairman I thank the distinguished representative of the Republic of Korea for her statement. The next speaker on my list is the distinguished representative of the Mexico. You have the floor.

Mr. J. Castillo (Mexico) "I don't think we're yet evolved to the point where we're clever enough to handle a complex situation as climate change. The inertia of humans is so huge that you can't really do anything meaningful." James Lovelock, British Scientist and Environmental Philosopher.

Mr. Chairman, distinguished delegates, it is in this context that I am placing my statement, to link it to space as that is where the impossible has been achieved. What at the beginning of last century seemed to be the realm of science fiction, thanks to the predecessors of the grey matter here in this room, managed to make it tangible and put it within our reach. That is why space science has the commitment and the obligation to contribute to the pursuit of the solution to this problem, starting from the privileged area where it stands today, in terms of its physical position — high up in outer space — and in terms of knowledge and intelligence of the members of the space community.

In Mexico, as was mentioned by my compatriot Dr. Santillán, we are undertaking a series of important activities in cooperation with other countries that link space science to offsetting climate change.

We cannot lose sight of the fact that Mexico is number 9 in terms of the 17 countries with greatest biodiversity — alongside other Latin American countries and the United States in our continent — because more than 10 per cent of the Earth's diversity as well as a huge number of endemic species of both flora and fauna are under threat because of climate change.

Mexico also has huge evergreen forest surfaces as well as semi-deciduous, deciduous woods, thorny shrubs, oak and pine forests and cloud forests, just to mention a few ecosystems, all of which are important sources of CO2 capture and which are threatened by the catastrophic consequences of climate change.

And we should not lose sight of the fact that climate change does not distinguish political borders and that what happens in one place affects others. This is why the space community within its whole range of activities has the obligation to join its efforts to seek real and tangible solutions to offsetting climate change through international cooperation and knowledge exchange. In that way, a challenge which seems impossible today can have a real and possible solution just like the conquest of space.

Thank you.

The Chairman I thank the distinguished representative of Mexico for his statement. Are there any other delegations wishing to make a statement under this agenda item at this time?

I see none. We have therefore concluded our consideration of agenda item 11, Space and Climate Change.

Distinguished delegates, I would now like to continue and conclude our consideration of agenda

item 12, Use of space technology in the United Nations system. The first speaker on my list is the distinguished representative of the Russian Federation. You have the floor.

Mr. V. Dyadyuchenko (Russian Federation) Thank you, Mr. Chairperson. I will be speaking on agenda item 12 and also on agenda item 9. We have quite effective international cooperation for space weather, and this is an effort where the Russian Federation is also active. We have achieved great progress in terms of detection and prediction of the possible adverse impact of sun storms on communication and navigation, as well as transportation systems, including water induction pipelines, oil pipelines and power transmission lines, among others.

There is one subject that is particular cause for concern and this is the impact of space weather on communication systems, navigation systems, as well as health, not just of passengers but also of crew members.

Bearing in mind space weather is all the more important in view of the growing automation of landing systems in order to step up the flow of air traffic. And here, in my opinion, COPUOS must note and give its support to cooperation with the World Meteorological Organization and of course also the International Civil Aviation Organization so that we prepare and harmonize procedures and formats for information given to the air carriers and passengers, and this is information having to do with the space weather impact that may have an adverse impact as I say on safety and the health of passengers because of radiation.

The World Meteorological Organization and ICAO will be preparing this work between now and 2016. We think that this activity is very useful indeed. To then have speedy implementation of a regulatory and rapid service in order to predict space weather for the benefit of civil aviation and the transport of passengers.

Thank you, Sir.

The Chairman I thank the distinguished representative of the Russian Federation for his statement. Are there any other delegations wishing to make a statement under this agenda item at this time?

I see none.

We have therefore concluded our consideration of agenda item 12, Use of space technology in the United Nations system.

Distinguished delegates, I would now like to begin our consideration of agenda item 13, Future role of the Committee. Before I go to the member States' statement, I would like if the delegation would allow me, I would like briefly explain my paper CRP.10, which was distributed last week. The title of the CRP.10 is "Next phase in global governance for space research and utilization".

The document was distributed last year, responding to the declaration of the fifty years anniversary of the COPUOS meeting. Last year I prepared this paper with some our history of the UNCOPUOS and this year I streamlined this paper as much as possible and a more action-oriented for the role of future COPUOS meeting.

This paper includes three pillars of the role of COPUOS. One is to strengthen the role of the Committee and its Subcommittees as a unique platform for the global level international cooperation in space science and technology, and long-term space utilization for the peaceful uses of outer space. The second is to promote greater dialogue between the Committee and the regional and interregional cooperation mechanisms in space activities for sustainable development. And thirdly, to stimulate the further advancement of space science and technology and the application for the benefit of all of humankind.

So, for the strengthening of the role of the Committee and Subcommittees, I propose to foster the contribution of space to all humanity through the application of space science and technology.

I'm proposing several actions. Firstly, with increasing awareness of and concern for the environmental impact on us of climate change associated with carbon cycle, water cycle, human health, food security relating to agriculture and fisheries and natural disaster, we should have more focus on those critical importance of monitoring these changes so we can develop and have some climate change mitigations, and adaptations, measures, by all countries.

So last year, the Rio+20 was held in the way, the future we want, the documentation was issued. And in the current post-2015 agenda we focus in all the sustainable development goals to be discussed and that is topics. And also we should have some more application like human health care, telemedicine and tele-epidemiology. Such a, you know, issue. We should have some more investigation by applying the space capability to that aspect.

And also, there are many discussions being held among, in the world. We should avoid such a duplication of efforts for overall consideration and

output. So we might have more intimate collaboration or discussion about related systems, especially in the U.N. system.

And also I'm proposing promoting more long-term space utilizations. Currently space technology was applied in many countries and space-faring nations and non-spacefaring nations should have more collaborative activities to bridge the development gap and further development towards the common goals.

There are many legal aspects to be considered under the COPUOS activities. And as you know, the current working group activities on the long-term sustainability of outer space activities are very important works to be done. The report is expected to be output in 2014 next year so we are very much looking for the outcome from the Working Group on this topics.

And the sustainable development, sustainability of space activities is important and the Expert Group B is especially discussing about this matter. The sustainability of space activity is affected by the significant space debris issues.

And recent space actors are very much increased not only the various countries are participating in the space activities but also the private sector and universities are all becoming space actors. And this under the UNCOPUOS, the member States are represented from the Government and the private sector and those universities should have, you know, more strong attention to our UNSPACE treaties, especially liability and responsibility and also registration of those space objects, which are launched by those entities.

Recently the compilation of small and nanosatellites for various objectives including scientific mission as well as observations and educational and capacity-building activities. I think it's a very important objectives for such a small satellite. But I strongly urge that such space actors should recognize that the current regulatory framework of the registration and liability instruments and in that sense the current session will have the resolution of national registration in every country.

This resolution will go to the General Assembly end of this year so it is strongly encouraged to have such national registration in individual countries. So this is a very important aspect and also I am recommending to have more greater dialogue between the Committee and the mechanisms for the regional and the interregional cooperation in space activities for the benefit of global development — especially currently in the African Leaders Conference will be held in this year. And also APRSAF and APSCO have the, you know, cooperative discussion being held. And also the Conference of America is also one of the, you know, methods to discuss this collaboration so it is very important to links between among us.

And already, you know, the UNOOSA has many activities like ICG and UN-SPIDER so under this framework further collaboration to have the more effective and efficient space activities should collaborate under this framework.

And finally I am promoting more global knowledge and expertise will be utilized among the countries because since we have already celebrated our fiftieth anniversary of this Committee and space activity was initiated since 1957, first satellite launch by Sputnik. Since then, many space activities was conducted and 50, more than 50 years means many expert people, you know, generated during this period and many people have retired but now, you know, the people's life is very much long so those, you know, expert people should be more contributive, contribute to the develop of this space activity so I'm thinking that we should have more, you know, focus on the such availability of those expert people to be new countries entering into space activities or the young people to be educated for the space, you know, activities. So those kind of, you know, propose I am describing in my paper. I like to ask you to read my paper and if you agree we will you know consider the role of future COPUOS activities around this, you know, proposal.

Thank you very much for your attention and I would like to invite the member States' statements. The first speaker is the distinguished representative of Japan. You have the floor.

Mr. M. Kobata (Japan) Thank you, Mr. Chairman.

Mr. Chairman, distinguished delegates, on behalf of the Japanese delegation, I am pleased to have the opportunity to address this visionary agenda item.

Recognizing the fundamental role of the Committee for exchanging views and observations on space activities in the past half century, I appreciate the effort of the Chairman of the Committee, Dr. Yasushi Horikawa, for developing and distributing a discussion paper numbered A/AC.105/2013/CRP.10 which contains various issues and challenges that must be tackled by the Committee. I am sure this paper will serve as a basis for continued discussions on the role and opportunities of the Committee in the near future. Following your initiative, Mr. Chairman, my delegation has prepared a draft workplan that proposes a highly effective mechanism of cooperative deliberation for "Space and Sustainable Development".

We appreciate any constructive feedback from Member States.

Mr. Chairman, I would like to draw the attention of all of delegations to the scale of this conference room paper and encourage further thoughtful consideration of the role that should be taken by the Committee in the next half century. Japan is entirely prepared for this discussion and we are looking forward to working on this issue together with all Member States.

Thank you for your kind attention.

The Chairman I thank the distinguished representative of Japan for his statement. The next speaker is the distinguished representative of Chile. You have the floor.

Mr. A. Labbe (Chile) Thank you, Mr. Chairperson. With the permission of other delegations, especially Spanish-speaking delegations, I will be speaking in English because I have an English-language document here.

I would like to thank you again, Mr. President, and I would like to thank colleagues from the Secretariat that contributed to the preparation of this important document. I had the opportunity in my opening remarks to refer briefly to your document and today I would like to react in a general fashion to its contents.

I would like to reiterate the importance that my country and our delegation attaches to this Committee, to our half century old Committee, and its heritage, which is underlined, expressed, explained — I'm sorry — in the opening paragraphs of your document.

Now, it is important to take good care of this heritage, and we need to protect the COPUOS as a valuable, important, multilateral forum, an important multilateral space. And in order to do it, we need not only to realize that the world has changed in the last fifty years, but that the way in which we do multilateral business has changed as well.

There is, there has been — I'm sorry — you can realize that I have no written text and the purpose, my purpose is to try to promote if possible a more interactive kind of discussion, you know. There has been on the one hand a very clear and significant advancement of science and technology and we have the impression that this progress in science and technology has not been reciprocated in an equal way by the advancement of the norm setting concerning the activities of humankind in outer space. I will come back in a few moments on this point in order signal simply that this perception is wrong.

We of course cannot deny the advancement of science and technology because we are witnessing it every day and its benefits are before our eyes in full display and our ordinary lives are in a certain way, I wouldn't say governed but very much informed by the new technologies that we use for communication and for interacting with human beings and simply conducting our lives in our vehicles in this world.

Now the norm-setting processes have progressed as well — only that progress has been achieved in ways different to the tradition of norm-setting via legally binding instruments. And we are one of those that recognize that the non-legally binding instruments, that is, the so-called "soft law", is not the preferred way for countries like mine with a traditional legal tradition based on roman law and based on the Napoleon code. We know all that, but soft law is not at all banal and we believe that it should be taken into serious consideration. So in order to keep the multilateral space, in order to strengthen them, in order to make them really important for the future, we need to look at reality as reality is.

And I'd like to commend you, Mr. President, because your paper invites us to consider these new developments and look at the reality not from the prospective of our prejudices or preferences or multilateral cultures but from the perspective of what we need at the moment. I believe that the key element here, the key word here, is relevance, and relevance was an element that came very much to the front, to the forefront, when we discussed in New York in 2005, the commencement of the process of reform of the United Nations. And then we were talking about the reinforcement, the strengthening of the General Assembly and other important fora and bodies of the United Nations. And somebody asks, asked for instance, concerning resolution of the ECOSOC: "Do we know what impact these resolutions have beyond Second Avenue in New York?" And the question was not rhetorical, it was, in fact, very pertinent, considering the way in which things are done, because when the problems exist, solutions start to arrive in different ways.

And now, at the United Nations, we are discussing, for instance, the problem of the global governance when it comes to economic affairs, because we realized that, through different formations — like the G20, for instance — the international community was responding to important crises and challenges in ways that were not provided for by the United Nations Charter, but since the problems exist, the solutions must be devised.

So thank you for calling us to look at realities. And reality here indicates that we have a new

complexity in the conducting of activities in outer space. The presence of what you call non-governmental actors, the presence of the private sector, the presence of new stakeholders — and allow me to use this word because it is good to indicate that there is an important degree of interest that needs to be brought in line into the activities or in the coherence, the increased coherence that you need — that we need, I'm sorry — to attach to what we do.

So in connection with your paper, I would say that we agree with your main ideas, contained in the introduction. And when it comes to your three chapters and your proposed topics for discussion, that we are absolutely in agreement, especially we believe that this Committee and its subsidiary bodies should have a participation in the going on — ongoing, I'm sorry — discussion related to the post-2015 development agenda, and that is applicable to the promoting of long-term space utilization.

I do not intend to go into detail concerning the document here but simply to make a general comment in connection with it. The presence of new actors and the presence of the private sector in outer space means that we need to look in different ways — in relevant ways — to the question of governance and the associated problems of normative norm-setting liability/responsibility that were underlined correctly by you in your paper. And if, in the realm of States, we have the paradigm of good governance that we use very much in multilateral settings — be it from, say, the development pillar of the United Nations to the human rights pillar — there is another paradigm that can be applied and should be applied to private sector actors that are now present in outer space, and that paradigm is the paradigm of good corporate citizenship. That should be fostered and the concept itself should be brought into our discussions and maybe into our products because this paradigm means that the private sector actors have a responsibility to behave themselves in a way which is consistent with the obligations as members of society and as representatives of sorts of States that are active in outer space.

So the necessity for regulation exists but we should try to look for ways of regulation that are not necessarily in conformity with our philosophical beliefs and our legal traditions but with the need to produce results. I was going to say results in deterring but of course that is not applicable to space. But tangible results, shaping conduct and that should be done in ways which are relevant and in ways which produce the desired results. Those ways are probably the ways of soft law.

So Chile belongs to that group of countries that has embraced, that have — I'm sorry — group of countries that have embraced globalization, but we believe in a globalization that is governed by rules and we would love to participate in the negotiation and the establishment and in the implementation and in the monitoring of those rules. Now rules is not the synonym of legally binding instruments. And we need in this respect to have a clear mind, to have open eyes, and to have the desire to obtain tangible results.

So congratulations and this delegation stands ready to keep participating in the discussion of your document and perhaps it could be not too strange idea to even hint at the possibility of opening a special agenda item for the discussion of this document.

Thank you, Mr. President.

The Chairman I thank the distinguished representative of Chile for his warm words and remarks. Thank you very much. I have the statement from the observers. I will give the floor to the distinguished representative of ITU. You have the floor.

Mr. Matas (International Telecommunication Organization) Thank you, Mr. Chairman. Good afternoon.

ITU, with great interest, studied the document CRP.10 and we can confirm that on all items listed in this document, ITU is ready to cooperate with the Committee but particularly I would like to amplify the long-term sustainability of space activities where we are cooperating now and we see future cooperation in this field, and especially I would like to inform you that, on the field of regulatory aspects of nano- and picosatellites, the WRC-12 charged the ITU or invited the ITU-R and member States to consider whether the modification of regulatory procedure for the nano- and picosatellites is needed to facilitate the deployment of these systems, and also to do examination of procedures for notifying such networks and on this field, we are especially looking forward to cooperate with the COPUOS on the field of long-term sustainability or the new initiatives, what you introduce in your document CRP.10.

Thank you very much and ITU is interested to cooperate in this field.

The Chairman I thank the distinguished representative of ITU for his remarks. Are there any other delegations wishing to make a statement under this agenda item at this time? Yes, I recognize the distinguished representative of Mexico. You have the floor.

Ms. Ramirez (Mexico) Thank you, Chairman. Thank you for this document. I'm concerned as a lawyer by the fact that we talk about compulsory rules or binding rules and non-binding rules. We are interested in the international code of conduct that regulates space activities in principle. This is a question we've commented on in several cases, but what isn't clear to me is that, something that's always coming up in the Legal Subcommittee, is the invitation to countries whose Governments have not ratified or adhered to the five space treaties, do so, because those treaties contain principles that have governed us for a long time. We have finely tuned them because they have inalienable rights for humanity. Well, I could spend a whole week explaining the advantages of treaties which are binding. I know from my own experience of more than 20 years in this forum that it's difficult to move a treaty from A to B. I also know that it's not easy to regulate private entities. It's probably a fallacy. Why? Because those in charge of the Governments that have adhered to the treaties. So when we talk about private companies involved in commercialization of space or space activities this is regulated by countries that have specific rules for that.

I am worried that in a forum where we adopt treaties where we establish regulations on space activities on soft law, basically, and on binding laws, then this does concern me. Mexico is in favour of treaties or regulations that govern outer space be part of binding provisions because the principles are enshrined there. I know that it's been fifty years since the first treaty was adopted. Things have changed since then. We talk about the commercialization of space. We talk about private initiative because the private sector has financial clout. There's ... the Moon Agreement has only been ratified by a few countries and we need to do our best to change that situation. There are many U.N. resolutions and guidelines and principles. We talk about non-binding provisions according to the treaty on the interpretation of treaties. However, international administrative habit has led us to take guidelines and provisions in a different light and what Mexico would like to do is reinforce international law, in this case international space law.

Thank you, Chairman.

The Chairman I thank the distinguished representative of Mexico for her remarks. Are there any other delegations wishing to make a statement under this agenda item at this time?

I see none. We will continue our consideration of agenda item 13, Future role of the Committee, tomorrow morning.

Distinguished delegates, I would now like to proceed with the technical presentations. Presenters are kindly reminded that technical presentations should be limited to 15 minutes in length.

The first presentation is by Mr. Vinay K. Dadhwal of India entitled "Space observation for governance and empowering citizens in India".

Mr. V. K. Dadhwal (India) Thank you, Mr. Chairman. I would be making a brief presentation, which will highlight the specific circumstances in India and how we operate the space applications programme so that the benefits are used both by the Government and the citizens.

I draw your attention to some simple background. We're 1.21 billion population, as per census of 2011. Sixty-eight per cent of them live in rural villages. There are more than 600,000 such villages and there are 22 official languages so most of the work in the state governments is done in one of these languages. There is a democracy starting from the villages up to the town city centre so there are 240,000 plus local bodies which have to govern in a multi-tiered democracy.

The circumstances are changing. There are 150 million Internet users. Basically they have access to a computer and bandwidth, but you can subtract them from 1.21 billion and find out the gaps. Actually there are 900 million mobile subscribers, maybe many people have some more than one licence. So the challenge which remains to, is to meet the natural resource requirement, reduce the exposure to disasters and share economic growth, the infrastructure. A lot of inequity which exists and how everybody should have access to the government services.

The space applications should not be taken in isolation because even otherwise the Government does create a number of policies, and information communication and other technology initiatives to address them. The idea is how to match the application-centric programme with other parts to derive the maximum benefit.

I would just like to draw your attention to the one of the programmes which is called the National e-Governance Initiative, which was started in 2006. It aims to make all available Government services accessible to each citizen in his locality through a privately established common service centres: 100,000 plus are supposed to be created and I believe more than 65,000 exist. And it has some 27 items under central ministry, state ministry and integrated. Basically relates to taxes, banking, insurance, pension, passport, immigration, a lot of other things.

More importantly, the idea that the challenge remains for us how we will convert the ICT for governments and citizens to Geo-ICT. This operates on MIS (management information system); it doesn't operate on geospatial platforms.

So the space programme has been there since 1970. There have been Indian continuous space-based observations since 1988 from IRS-1A, so there are three areas: one is satellite communication, Earth observation and the newly coming up, the GPS-aided augmented navigation for aircrafts as well as the IRNSS, which will have the first satellite launched next month.

So the idea is to be able to provide these satellite-derived services over land and water, cartography or ocean and atmosphere to either for a government-specific example or for citizen. So the solution is a technology-based sustainable solution, which has three parts. The output from geospatial technology. Another important aspect of this is they have to be near-real time if they have to be used for decision-making. The government initiatives plus a lot of things which exist with the private entities, academia and civil society initiatives. So we need to establish end-to-end near-real time EO data supply, interpretation/outputs, GIS framework and web access with open source tools, so that everybody can access to that.

Another advantage of this approach is that since there are so many local bodies, each one cannot spend funds to really create specialized hardware and software. Just Internet access should be sufficient to carry out many ballistic functions. I will illustrate it with a few simple examples.

So how to ensure that EO gets converted into geomatics by adding GIS layers, a GIS framework, non-spatial attribute and some simple decision-support tools to have, to give everybody a reliable data. A government should be able to go to a target area for any specific policies as well as monitor the programme. For government departments, actually the challenge is internalization. They can always ask somebody else to do but it will never be timely and their own staff will not do. So we try to stress on capacity to absorb that application by the department itself. Plus they should be able to match their internal MIS with the geospatial data.

So I have some examples of the land resources for wastelands, for providing drinking water, urban planning, disaster, environment protection and supporting the decentralized planning. I would just briefly touch upon the specific issues, the central theme. India has, out of 328 million hectares, 64 million hectares, which when it was assessed the first time, which were not being used for productive uses. So the government was, and especially the space agency, was mapping it, as many schemes were done to reclaim the wasteland for agricultural applications. As you can see the area under wasteland goes on decreasing. However, for local decision-making, what we have done from that last exercise is we have made these maps accessible at 1:50,000 in the entire nation. So you can overlay village boundary and see which village in the block has the maximum, where you should target your attention.

In addition to the wasteland, it also has 28 different categories, which help you to tell what type of intervention will be required and you can compute rough costs.

Next example is out of 600,000 villages, many villages do not have access to water or an inaccurate amount of drinking water. So we have done for the entire country geomorphology mapping and created such maps at 50000 scale, which tell which is the closest to a village area or a geographic entity where drinking water, underground water would be available. So these are water prospect maps. Using such maps, around 300,000 bore wells have been dug in the past 4 or 5 years, with 93 per cent success rate.

Digging a well is a costly exercise. Normally the success rates are 40 to 50 per cent. So you can roughly imagine if you can exceed your rate, then you have [ ].

Additionally because of these types of features, you can also use to construct recharge structures. This is to ensure the sustainability of water availability because in most parts of the country, the groundwater is depleting very rapidly. So recharge structure location is an important aspect.

Next comes, as I was explaining, a lot of money spent in reclamation so the national wasteland, the reclamation project, like these are the districts where they have carried out. Each is small 500-hectare watershed so what is done is, the indicators of success of intervention, where government gives subsidy money for farmers to reclaim their land, is actually monitored by satellite data through such a GIS system. The country has now 31.5 per cent urban population, that makes it almost 370 million people living in urban towns. Now there are 800 urban entities but the master plan for development is available for less than 25 per cent so we take the project to do 10,000, 2,000 and 1,000 scale geospatial database for preparing master plan of these cities. So this is then is used by the town planning department to really regulate how the city should grow.

Disaster events are very important aspect. Other than the observation we also have a virtual private

network through space which communicates between the space agency and the state control room. What we have now done is through this, what I was telling, which allows you visualization, it has a data archive, it gives you thematic services, it gives in multiple languages, it is also available on mobile. People can anywhere access and depending upon lot of things are open for public and the government have the access, additional access to there, some MIS related. They can do a service without spending money on infrastructure, hardware or software.

I'll just illustrate with a few examples. The Irrigation Ministry gives lot of money for on-farm work of strengthening and making this small sum minus and minus. At the completion of this continuity is important for expanding the irrigation infrastructure. So monitoring the irrigation infrastructure through a CARTOSAT 12 metre data is what we have operationalized for the central water commission. So these images are uploaded regularly.

Similarly for this one is to 10000 scale maps more than 150 urban towns have been hosted. So the local town planning bodies, depending upon the way it is growing, they can alter it and reupload. Citizens can also see, and if they want, they could also submit objection.

In disaster management the forest fire which we try to, we use modest data but we process and within half an hour, any file located by SMS it goes to the district forest officer. Layer of flood inundation, monthly drought assessment, the landslide hazard along the hilly area, and actual landslide by the satellite data. This all is provided. One very good example is if you were to go to Bhuvan website now, the yesterday's heavy rainfall in Uttarakhand, the inundated areas is available in this form, even as of now. I have checked.

Very important area is that India has three regions of global importance for biodiversity. Western part, this is a very hilly region, is one of them. So for government to make a policy of over 80,000 square kilometres which area or development projects should be stopped. So we used a biodiversity map derived from fragmentation and biological richness and through a decision-making rule. This was done to identify something like 60,000 square kilometre of which 37 per cent more development activity should take place. So with policy regulation also we have found it to be very useful.

Slowly, the citizens also find such services. I'll just give you four examples. One is the potential fishery zone forecast for the fishermen, other is to how to locate your water conservation structure. Master plan which I have [ ]. And in addition to the real time disaster information, which is mostly for the relief, how to use it for flood hazard zonation.

There are 6 million fishermen and we have over 20 years work done in methodology, which are here used only sea surface temperature. Then chlorophyll from OceanSat-1, now a sea surface temperature, chlorophyll and wind vector derived from the sky perimeter on OceanSat. All the three are combined to give lightly areas of potential fishing. Now at 95 landing station, this information is made available twice a week, it is also available in the local radio and newspaper and to the register, some 45,000 fishermen. It goes by SMS also. So they really go in which direction they should go, and it has been found it improves the catch effort by 30 per cent.

This is other thing, what we have done is over more than 10 years of this satellite data of every yearly flood inundation map, we have created hazard zonation and risk map where for each village, which portion has high, low and medium hazards is. It allows citizens and the local boardies to really be aware of the type of risk for their particular and that develops resilience mechanisms.

VRC is the last point, which is a unique example, where the space communication, tele-education, telehealth is added with the natural resource data from satellite and made available through satellite connectivity directly to the village community and there are around 460 such things. And a large number of programmes are actually delivered every week for this specific target audience.

We recently put on a municipal GIS where the citizens can find out for each locality tax and other interactions with the municipality as experimental and as certain flood hazard zonation. These are only some of the examples. I just wanted to highlight how to create an environment where space outputs could directly go for use by the government as well as other citizens.

Thank you very much for your attention.

The Chairman Thank you Mr. Dadhwal for your presentation. Is there any delegate who has questions for the presenter?

I see none. Thank you very much for your information on these topics. The second presentation on my list is by Mr. Natan Eismont of the Russian Federation entitled "Deflecting hazardous asteroids from collision with the Earth by using small asteroids". Mr. Eismont, you have the floor.

Mr. Eismont (Russian Federation) Thank you, Mr. Chairman.

Delegates, I would like to draw attention to the problem of preventing collision of the hazardous sky objects with the Earth. The idea consists of targeting a very small asteroid to impact a larger dangerous one. The minimum size of this small asteroid is determined by the ability to detect it and to determine its orbit. The small object may have a diameter of about 10 to 15 metres. Asteroids are selected from the near-Earth class that have a fly-by distance from Earth of the order of hundreds of thousands of kilometres. According to current estimates, the number of near-Earth asteroids with such sizes is high enough. According to current estimates, the number of such asteroids is as high as 100,000.

Now those asteroids which are in the G-belt catalogue is about 4,000. So there is a possibility to find the required small asteroid. Further, the possibility is evaluated of changing the small asteroid's orbit so that by application of very limited delta-V impulse to the asteroid, the latter is transferred to a gravity assist manoeuvre (Earth swing-by) that puts it on a collision course with a dangerous asteroid. It is obvious that in order to apply the required delta-V pulse it is necessary to install on the small asteroid an appropriate propulsion system with required propellant mass.

I would like to tell you that this idea is different from the so-called classical idea, to use, for example, the spacecraft, in order to keep dangerous asteroid, but let me to tell you that, for example, such hazardous asteroids as well-known Apophis has the mass about 40 million metric tons and the spacecraft, which is possible by contemporary technology, to send to this asteroid has the maximum mass of about 5 metric tons. So in case one such spacecraft would hit the asteroid such as like Apophis, this hazardous asteroid will not even will feel this impact. So the main goal of this presentation is to demonstrate that the proposed concept is feasible.

This scheme is some simplified scheme of the scenario of the mission which is aimed to deflect the dangerous asteroid — for example, Apophis — from the trajectory for hitting the Earth. Initially we launch from the air at low orbit the spacecraft will then landing on the chosen small asteroid. After landing, the spacecraft is fixed on the surface and then we choose the appropriate instant to apply very small pulse to this chosen small asteroid. And after this, the spacecraft begins its motion to the point where the so-called gravity assist manoeuvre is to be fulfilled. After fulfilling this gravity assist manoeuvre, the asteroid is targeted to the Apophis. This is the principal idea.

In order to explain the main point of this idea, I would like to show you some scheme where the gravity assist manoeuvre is fulfilled. You know, after fly-by of this Earth or other planet, the relative velocity change changes its direction but keep the, but in the sense of the velocity in the solar system, the absolute velocity in this case is maybe changing and change to very high extent — for example, by maybe up to 10 kilometres per second. Very difficult to do even for spacecraft by the rocket engine and impossible to do with the asteroid even as small as the sizes about 10-15 metres. Such mentioned asteroid would have the mass about 1,500 metric tons. It's impossible to change this velocity by such value as, for example, 7 or maybe 10 kilometres per second, but gravity assist manoeuvre — properly executed — allows to do this.

And results of our studies. In the table one can see the chosen asteroids, comparatively small asteroids, which was found in the catalogue of Jet Propulsion Laboratory and as one can see on the first thing, for the asteroid 2006XV4, only 2.4 metres per second is enough in order to change its trajectory in such a way that after this, the gravity assistant manoeuvre will allow this asteroid to hit the Apophis. For the other asteroids, as one can see, they demand more delta-V but still it's very very small values. And also in this table one can see the duration of the mission beginning from the execution of the manoeuvre to change the initial velocity of the spacecraft by the applying this small pulse until the manoeuvre of the gravity assist near the Earth, and the final date is the reaching the Apophis, the hitting the Apophis. And for the first column, one can see that the duration of all these operations takes about 5 years — so not so short. But impact velocity in this case is, as one can see, high enough and the high enough mass of the asteroid which is surely higher than 1.5 metric tons. One has the perfect chance to deflect the asteroid from the trajectory which in another case will hit the Earth.

In the next slide one can see what is the course to reach this asteroid, which further will be used as the projectile. And after some steps of optimizing the final total delta-V is never exceed 6 kilometres per second, which is quite doable for the contemporary launch vehicles. It's the last column and in the right in this thing the last figures. And you see that all these considered phases for three asteroid, the value of the delta-V is quite tolerable to deliver the spacecraft to this asteroid, which will be used as the asteroid-projectile. Or in another, from another point of view, one can consider it the spacecraft but the very heavy payload.

And after these calculations we cannot only assume but to be sure that the values which allow to implement such approach are quite acceptable and even the radius of the Earth's fly-by, which was also determined, is quite in the acceptable range. So one can

say that 7,000 kilometres maybe a little bit too low but it's the, I would say, limited case. In most of the other cases, this value exceeded several thousands of the kilometres.

So in the next slide, I would like to just demonstrate the trajectory have to reach the asteroid-projectile and one can see that its, well, in the framework of the contemporary technology, and it takes not so long time — one, two years, something like this — so it's quite acceptable. Here the two versions are presented with the optimizing total delta-V and the other optimizing for departure delta-V, which maybe both are good, but for the chemical engines the best version is preferred.

And the next slide demonstrates some model scenario of the hitting the Apophis by the asteroid, you see his name. And the duration of the whole operations takes only 5 years and 8 months, so for the contemporary aerospace technology it's not so long.

And the other case, with the other asteroid, the whole scenario takes 4 years and 9 months, but one can propose some development of this idea. Instead of using the asteroids each are to be find in case of some dangerous sky object is disclosed and this object trajectory is calculated. It's possible to build, to build some, some system from small asteroid. The proposed concept of using small asteroid to deflect hazardous object from the trajectory of collision with the Earth may be developed. Further, the slide says the idea is to transfer small asteroids onto Earth resonance orbits, for example with period of one year, using described above method of gravity assist manoeuvre. It meant that using the same gravity assist manoeuvre you can transfer the chosen asteroid, small enough, into the orbit which we will be resonance with the Earth's orbit. So each year this asteroid will return back to the Earth's and it's possible in this case to fulfil the mentioned above gravity assist manoeuvre to target this asteroid into the dangerous sky object.

Thus system is constructed, which allows sending asteroid-projectile to the hazardous object approximately each month during the year. This statement confirms the next table. You see here the 13 chosen asteroids as the candidates for the constructed system and two of these asteroids could be transferred to Earth's orbit to assure they are exploded from this list but still we have 11 asteroids which can be used for construction of this system which allow us to, I would say, to use them each month in order to reach some dangerous sky object.

And in conclusion the described method of dangerous asteroids deflection from the trajectory of collision with the Earth as it was shown on the example of Apophis may be considered as doable. It was found that very small delta-V (2.4 m/s) may be required to transfer small asteroid to the trajectory, what includes gravity assist manoeuvre near Earth, followed by collision of this asteroid with the hazardous object like Apophis. Proposed method allows to change velocity of dangerous object by the value unachievable by any other contemporary technologies. For practical implementation of the proposed approach some further progress in broadening the catalogue of candidate asteroid-projectile is needed especially as it is related to small asteroids. Also additional studies are required for reaching lower demands for correction manoeuvre delta-Vs.

Construction the system consisting from resonance asteroids which periodically fly by the Earth to be ready targeted to hazardous sky object is shown to be as written doable.

Thank you so much for your attention.

The Chairman Thank you Mr. Eismont for your presentations. Is there any delegate who has questions for the presenter? Yes, Mr. Wolanski, you have the floor.

Mr. O. Wolanski (Vice-Chair) This is a very interesting new suggestion how to deal with the asteroids using the gravity assist method on small asteroids so congratulations with this. New idea but they are of course other questions which will still be arising as you mentioned. Did you calculate how much this big asteroid Apophis will change the velocity after the collision? Is this 2.38 metres per second if I understood well? And the second question is: did you try to calculate, you know, how many new smaller objects would be generated after such collision? Thank you.

Mr. N. Eismont (Russian Federation) For the first question, you know, if you use the asteroid with a mass of approximately 1,500 metric tons, then after the collision, then the velocity of Apophis, which has the mass about 40 million metric tons may be changed by approximately .3 metres per second. That's quite enough to deviate it from the collision from the Earth.

And about your second question: how many fragments will we receive after this collision? Sorry but I can't answer you this question. It demands some additional exploration and studies but you know, in case it will separate and be destroyed to the small ones, definitely they are not so dangerous as the initial one.

The Chairman Thank you for your question. I recognize the distinguished representative of Mexico. You have the floor.

Ms. Ramirez (Mexico) Thank you, Sir. A question, if I may, very basic. Now, perhaps space debris will have less significance than the fact that the asteroid, which is large in size, would impact the Earth. So either this ends our time as a planet or else we go back to the phase when the dinosaurs disappeared because of the impact of a major asteroid. So it's a very simple mathematical relationship — cost-benefit, I think.

Thank you, Sir.

The Chairman I thank the distinguished representative of Mexico for her statement. Would you like to respond something?

Mr. N. Eismont (Russian Federation) I mean, does your statement demand some response?

The Chairman Yeah, that's it. Ok. Yeah. We don't need a response.

Mr. N. Eismont (Russian Federation) Thank you.

The Chairman Is there any delegate wishing to have some questions for the presenter? I see none. So thank you very much for your presentation. Very good presentations.

Distinguished delegates, I will shortly adjourn this meeting. Before doing so I would like to inform you about our schedule for tomorrow morning. We will meet promptly at 10.00 a.m. At that time, we will continue our consideration of agenda item 13, Future role of the Committee. We will begin our consideration of agenda item 14, Other matters. Expert Group B will meet from 9.30 to 11.00 a.m. in room C6.

During the lunch time tomorrow, from 1.15 to 1.45 p.m. all delegates are cordially invited to a donation ceremony at the Space Exhibit of the Office for Outer Space Affairs. The State of Israel will be donating a model of their Earth observation satellite "OpSat 2000" to the permanent OOSA space exhibit, which is located on the ground floor, corridor D to 0E Building. Speakers include the Minister of Science, Technology and Space of Israel, the Director of the Israeli Space Agency and the Director-General of the United Nations Office at Vienna. The ceremony will take place from 1.15 to 1.45 p.m. at the OOSA Space Exhibit.

Distinguished delegations are also kindly reminded to provide to the Secretariat corrections or additions to the provisional list of participants (CRP.2) by close of business today — so now, I mean — so that the Secretariat can finalize the list.

Now I'll give the floor to the Secretariat for the announcement.

Mr. N. Hedman (Secretariat) Thank you, Mr. Chairman. In addition, tomorrow during lunch time from 1 p.m. to 2 p.m. there will be a joint meeting of the Expert Groups of the Working Group on the Long-Term Sustainability of Outer Space Activities. The joint meeting will take place in room C4.

The Working Group on the Long-Term Sustainability of Outer Space Activities will hold its second meeting tomorrow afternoon, here in board room D.

Distinguished delegates, while I have the floor, I also would like to give some information regarding the Heurigen evening that we have before us this evening. I have been informed that there will be a plan on the screen. Yes, so distinguished delegates, you are all cordially invited by the Austrian delegation and Secretary General for Foreign Affairs, Ambassador Johannes Kyrle to attend this Heurigen evening, and as you can see the Heurigen is the Heurigen Müller Schmidt and the address is — as you can see on the screen — Cobenzlgasse 38 and it's also stated there so you can easily go there. It means you take the U-Bahn to Schottentor and there you take the tram number 38 until the last stop, Grinzing. The Heurigen dinner begins at 7.30 p.m. Thank you.

The Chairman Thank you, Niklas, for your announcement. This morning and this afternoon, I said it was 19 o'clock, I mean 7 o'clock but time is now changed. It's 7.30, 19.30, so please remind you again.

Are there any questions to this proposed schedule? I see none. So this meeting is adjourned until tomorrow morning, 10 o'clock tomorrow.